

Improving Meteorological Model Accuracy by Disregarding Data from Southern Hemisphere and Assigning Variable Certainty Values to Systems According to Latitude

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Present-day “global models” used for weather forecasting take into account weather systems around the world in order to create a more accurate forecast. So the logic goes, taking more into account reduces uncertainty.

What these global models overlook, amongst other things, is the fact that the opposing direction of circulation of atmosphere in the Northern versus the Southern hemisphere prevents meaningful interactions between weather systems in the two hemispheres. To the extent that there are interactions, these interactions nearly always average out between the two sides, making it entirely counterproductive to perform complex computations describing the interactions between air masses near the equator. If we were to perform absolutely no computations with regard to the Southern Hemisphere and were, instead, to make some general assumptions about the behavior of atmosphere as it crosses this boundary, it would reduce the computational complexity of the operative model logarithmically and dramatically improve model accuracy. Models for the Northern and Southern Hemisphere should be computed entirely separately and the global model should be discontinued.

Such a “hemispheric” model should, furthermore, take into account the variable predictability of weather systems depending upon their latitude. Systems near the 45th Parallel are the least predictable, particularly those which are undergoing a change in their prevailing direction of travel (e.g. a tropical system.) The Coriolis Effect causes tropical systems, which begin by moving westwardly in the Northern Hemisphere to gradually curve until finally terminating at the North Pole, where low pressure systems are integrated into the Polar Vortex.

The current “global models” are ensemble-based, meaning that various scenarios are created by changing the fundamental assumptions about how weather systems will behave. These models attribute too high a degree of uncertainty to equatorial and polar systems and too little a degree of uncertainty to systems near the 45th Parallel. Forecast accuracy could be improved by assigning variable weights of uncertainty according to latitude.

Although other factors must be accounted for, one fundamental factor not properly being accounted for is the tendency for all atmospheric vortices at the mid-latitudes to follow a curved path governed by the Coriolis Effect which causes the vortices to tend to terminate at the poles.

Current models employ a type of logic reminiscent of Game Theory in which the behavior of pressure systems is guessed at along the lines of, “if this systems does X and if this other system does Y, then system Z should wind up over here.” The prevailing tendency of all of the systems is actually entirely predictable and all of the systems must follow the principle set forth by

Coriolis. This should be a fixed constant in the models and all vortices must be assumed to follow this principle.